

Discussion on Enhancement for Supporting 5G Indirect Network Sharing in R19 (SA2 potential SID for Network Sharing topic)

China Unicom

(for information)

Overview

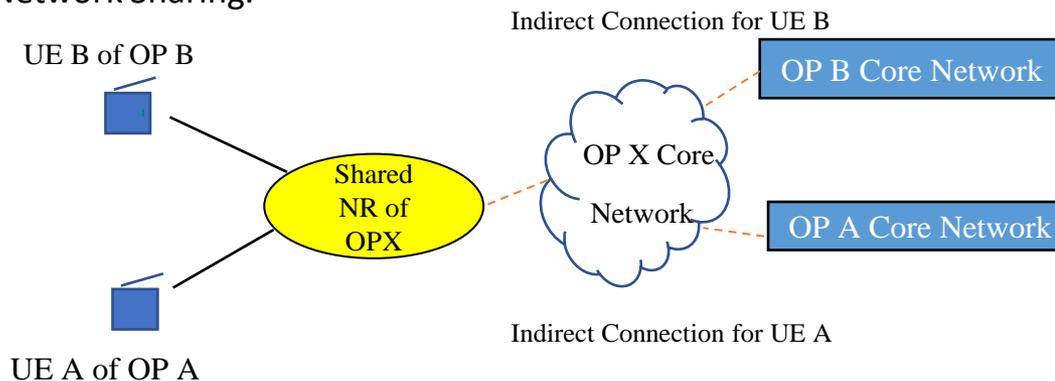
Concept

Indirect Network Sharing defines a type of NG-RAN Sharing in which the communication between the Shared NG-RAN and the Participating Operator's core network is routed through the Hosting NG-RAN Operator's core network. (TS 22.261)

Motivation

Network Sharing mechanism enables the operators to maximize rollout and improve overall network coverage. This study item aims at studying system enhancements for supporting new Network Sharing mechanism different from 5G MOCN in 5G System (i.e. Indirect Network Sharing defined in SA1), without the requirements for the operators to maintain a large number of interfaces between Hosting Operator's Shared NR and Participating Operator's core network (e.g. N2/N3 interfaces).

Considering charging aspect, the charging and accounting crossing PLMNs can be supported in 5G Indirect Network Sharing.



NOTE : The concept, use cases and requirements of Indirect Network Sharing are described in 3GPP TR 22.851 and TS 22.261.

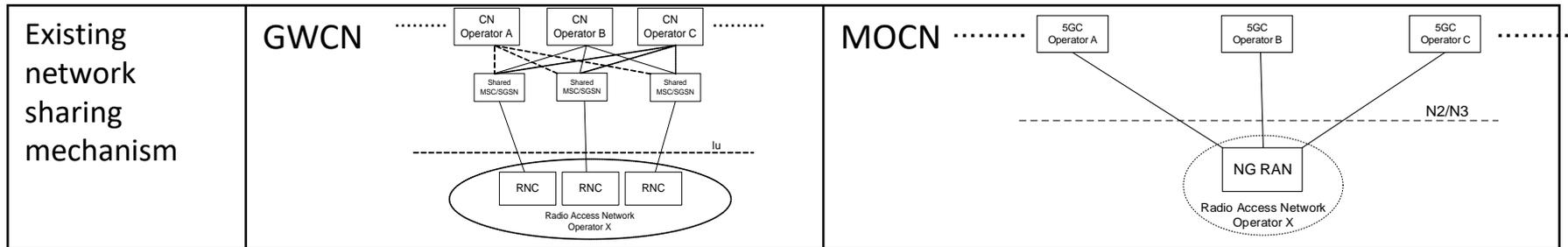
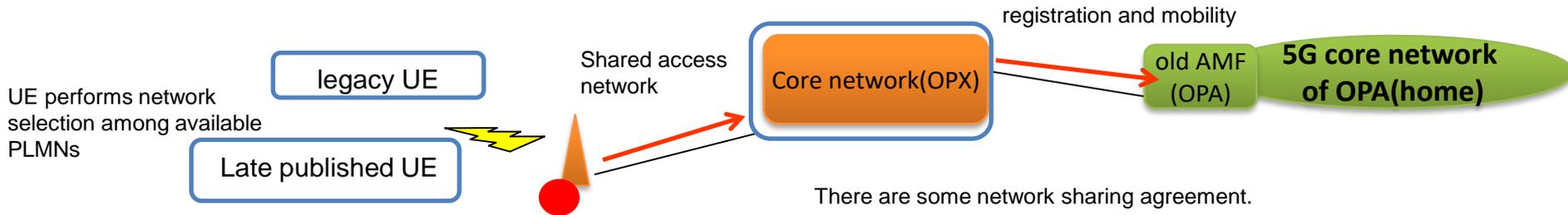
Stage 1 scenario and requirement

New scenario

- 1, network sharing scenarios
- 2, OPX's RAN is connected to OPX's core network
- 3, UE's user subscription belongs to OPA
- 4, UE accesses with shared PLMN

Consolidated requirements in TR 22.851:

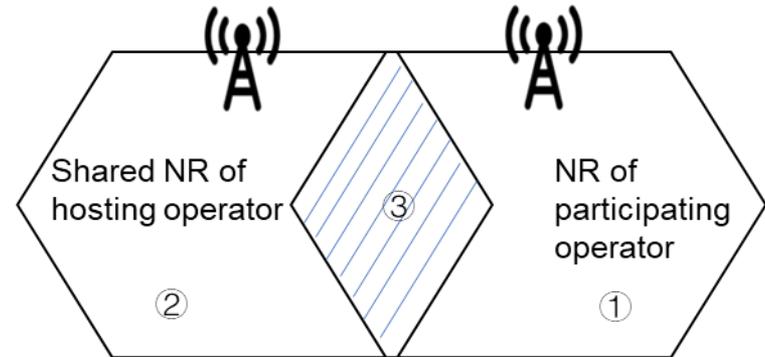
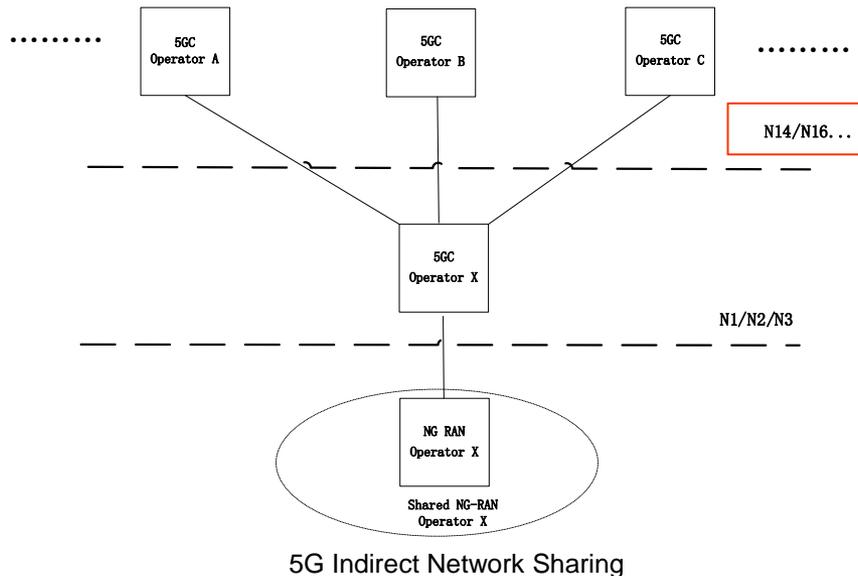
- 1, general aspects
- 2, mobility management
- 3, network access control
- 4, regulatory and charging aspects



1. Compared with MOCN: Indirect Network Sharing can avoid the maintenance of the large amount of N2/N3 interfaces, charging aspect crossing different PLMNs
2. Compared with GWCN: Indirect Network Sharing can avoid the maintenance of the large amount of N3 interfaces, no define about 5G GWCN

SA2 - General architecture

Architecture:



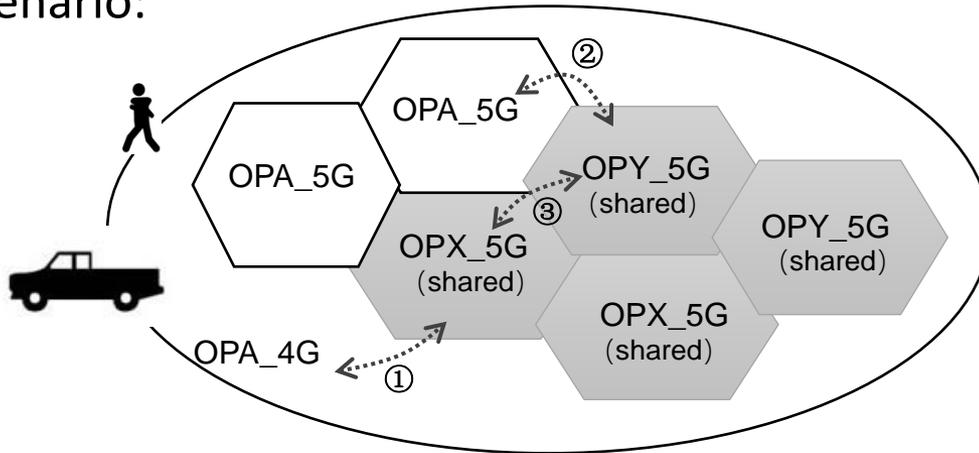
In 5G Indirect Network Sharing case, the reasonable priority of PLMN and access network selection is NR of participating operator > shared NR of hosting operator > E-UTRAN of participating operator. And in the boundary area ③, the precise network selection needs to be studied.

Observation:

- The potential impact to existing architecture to support Indirect Network Sharing may need to be studied.
- The potential 5GC enhancement needs to be investigated to enable the authorized UEs to access the subscribed PLMN to use services in 5G Indirect Network Sharing scenario, e.g. enhanced network selection, identification of network sharing type, authorization of the UEs by the enabling operators, etc.

SA2 - Mobility management

Scenario:



OP A: Participating Operator
OP X: Hosting Operator
OP Y: Hosting Operator

① : mobility between the 4G and 5G, using N26 based interworking procedures

② ③ : mobility between two different 5G networks, using ETSUN mobility procedures with updated description

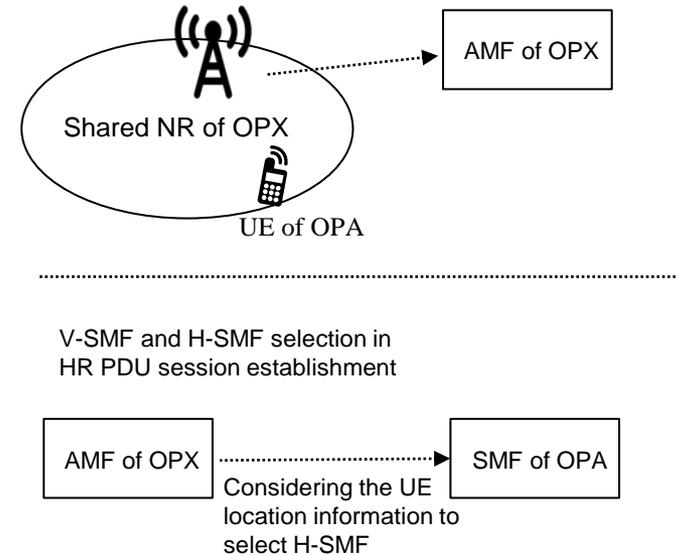
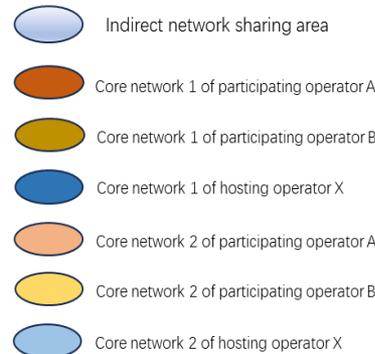
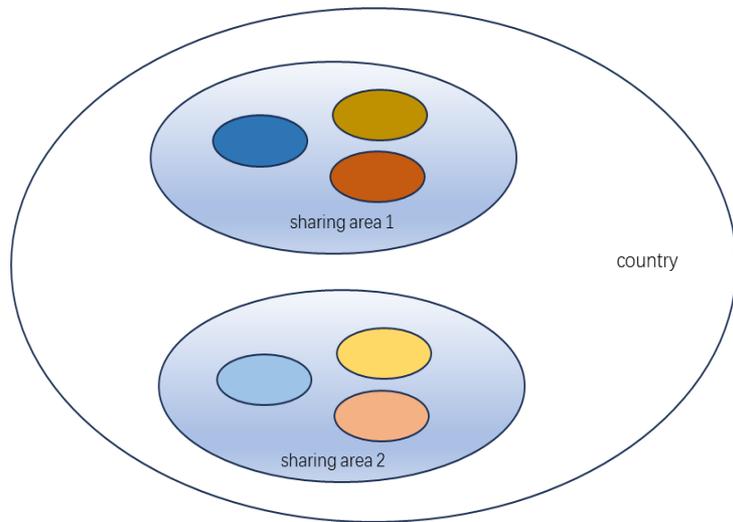
The authorization requirements specifically for the users accessing the shared network needs to be studied.

Observation:

- When the UE moves between two different PLMNs, the authorization requirements specifically for the users accessing the shared network may need to be investigated. Therefore the potential enhancement needs to be investigated in inter PLMN mobility procedure.

SA2 - NF selection

Scenario:



Observation:

- In existing specification, the NF selection mechanism cannot guarantee the selection of the optimal NFs in 5G Indirect Network Sharing scenarios, e.g. H-SMF selection considering UE location information in the HR PDU session establishment procedure cannot be supported. Therefore how to enhance the NF selection mechanism to select the optimal NFs in 5G Indirect Network Sharing scenario needs to be investigated.

SA2 – Suggested objectives

- 📶 WT-1: Investigate potential impact to existing architecture, if any, to support Indirect Network Sharing specified in TS 22.261.
- 📶 WT-2: Investigate the potential enhancements to enable authorized UEs to access the subscribed PLMN to use service in 5G Indirect Network Sharing scenario, e.g. enhanced network selection, identification of network sharing type, authorization of the UEs, etc.
- 📶 WT-3: Investigate the potential enhancements on the inter PLMN mobility procedure in 5G Indirect Network Sharing scenario.
- 📶 WT-4: Investigate the potential enhancements of NF selection mechanism for selecting the optimal NFs accurately in case of Inter-PLMN operations arising from 5G Indirect Network Sharing scenario.
- 📶 NOTE: It is assumed there is no UE impact.

Suggested TU estimation:

Total TU estimates for the study phase: 3 TUs

Total TU estimates for the normative phase: 2 TUs

Total TU estimates: 5 TUs

Work Task ID	TU Estimate (Study)	TU Estimate (Normative)	RAN Dependency (Yes/No/Maybe)	Inter Work Tasks Dependency
WT-1	1	0,5	maybe	
WT-2	1	0,5	maybe	WT-1
WT-3	0,5	0,5	no	WT-1, WT-2
WT-4	0,5	0,5	no	WT-1

Potential impact in other WGs



- 📶 Security aspects will be coordinated with SA3
- 📶 Charging and management aspects will be coordinated with SA5

Proposed Way Forward



- It is proposed to start a study item of supporting 5G Indirect Network Sharing to investigate the aspects listed as above
- Work scope in different impacted SA WGs should be aligned on a high level